

REMARKS

Applicants request favorable reconsideration and allowance of this application in view of the foregoing amendments and the following remarks.

Claims 1, 3-7, and 9-84 are pending in this application. Claims 2 and 8 have been cancelled without prejudice.

Claims 39-80 stand withdrawn from consideration. Claims 1 and 7 are the only independent claims under consideration.

Claims 1, 3-7, 9-14, 19, 25, 27, 29, 31, 33, 35, and 37 have been amended and Claims 81-84 have been added. No new matter has been added.

Applicant appreciates the indication that certain claims would be allowable if rewritten in independent form. However, since Applicant believes the independent claims are allowable for the reasons discussed below, the dependent claims have not been rewritten at this time.

Claims 1, 7, 14, and 19 have been rejected under 35.U.S.C. §112, second paragraph, as being indefinite because it is unclear whether the limitations following the phrase "such as" are part of the claimed invention. In view of the Examiner's comments, Applicant has amended those claims and submits that the amended claims obviate the Examiner's objection. Favorable reconsideration and withdrawal of this rejection are requested.

Claims 1-3, 6-9, 12, 13, and 25 have been rejected under 35.U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,332,030 (Manjunath, et al.). Claims 4, 10, 25, 27, 29, 33, 35, and 37 have been variously rejected under 35.U.S.C. §103(a) as being unpatentable over Manjunath, et al. in view of one of U.S. Patent No. 6,359,998 (Cooklev), U.S. Patent No.

6,373,974 (Zeng), U.S. Patent No. 6,163,842 (Barton), U.S. Patent No. 6,370,258 (Uchida) or U.S. Patent No. 6,314,192 (Chen, et al.). Applicant respectfully traverses these rejections for the reasons discussed below.

As recited in Claims 1 and 7, the present invention relates to digital watermarking. As noted in the Office Action, and discussed in Manjunath, trade-offs between choosing low frequency coefficients and high frequency coefficents for embedding a digital watermark are well-known. For example, the low frequency DWT subbands are robust with respect to compression, but their modification can bring about visible artifacts. On the other hand, the high frequency coefficients can be modified without visual artifacts, but they are highly sensitive to JPEG compression. In order to resolve this issue, Manjunath proposes two solutions in the DWT domain:

1. As disclosed in Fig. 1 and at col. 11, lines 4 to 11, all subband coefficients are modulated. In this embodiment, only one decomposition level is performed, resulting in 4 subbands (See col. 6, lines 53-56 and col. 10, lines 52-54), and each subband of the signature is embedded into the corresponding subband (LL, HL, LH, HH) of the host image.

2. As disclosed in Fig. 26 and at col. 21, lines 1-5, wavelet decomposition is made and only the coefficients of the HH subband of level 1 are chosen for embedding supplementary data.

However, Applicant submits that Manjunath does not disclose or suggest the features of the present invention recited in Claims 1 and 7. Specifically, Applicant submits that the cited art does not disclose or suggest at least the feature of multi-resolution spectral

breakdown of the digital data at a level (d) predetermined so that a number (n) of components of lowest frequency is between 8x8 and 32x32. Due to this feature, the lowest coefficients (in the LL subband) are modulated conditionally to a sufficient number of decomposition levels so as to obtain a small size LL subband, wherein each LL coefficient represents an average value of a large spatial area in the image.

Applicant submits that Manjunath does not disclose or suggest at least the above-mentioned feature. In this regard, Applicant notes that the Examiner makes references to col. 15, lines 62-65 of that patent. However, that portion of Manjunath simply relates to the choice of an 8x8 block in order to obtain an 8x8 DCT block. Only some of the DCT coefficients correspond to low frequency. In fact, only one coefficient, the DC coefficient, corresponds to low frequency in accordance with the understanding of low frequency in the present invention of Claims 1 and 7. This is basic image processing information regarding the well-known DCT and does not relate to the choice of a sufficient number of DWT decomposition levels to obtain an 8x8 LL subband.

The distinctions between the present invention recited in Claims 1 and 7 and the cited art may better be understood with reference to a particular example. Consider, for example, that in a 256x256 image there are 32x32 blocks each having size 8x8. Applying one DWT decomposition level as disclosed in Manjunath, the size of the LL subband is 128x128, and the size is 64x64 for 2 decomposition levels. In contrast, according to the present invention as recited in Claims 1 and 7, at least 3 decomposition levels are needed to obtain a 32x32 LL subband, and at least 5 decomposition levels are needed to obtain an 8x8 subband. Since Manjunath does not disclose or suggest a step of breakdown up to a resolution level determined

so that the number n of components of the approximation subband LL is between 8x8 and 32x32, as recited in Claims 1 and 7, Applicant submits that those claims are patentable over that patent.

The other cited art also is not understood to disclose or suggest at least the above-discussed feature, and therefore that art does not remedy the deficiencies of Manjunath.

For the foregoing reasons, Applicant submits that Claims 1 and 7 are patentable. The dependent claims are patentable for at least the same reasons, as well as for the additional features they recite.

For the foregoing reasons, Applicant submits that this application is in condition for allowance. Favorable reconsideration, withdrawal of the rejections set forth in the above-mentioned Office Action, and an early Notice of Allowance are requested.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should be directed to our below-listed address.

Respectfully submitted,



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